

Robotic Mine Countermeasure Technology Development

US Air Force Research Laboratory, Tyndall AFB, Florida

THE NEED

The US Naval warfare concept of Operational Maneuver from the Sea in support of expeditionary warfare requires the US Marine Corps to be able to defeat enemy measures. These operations must be designed to prevent amphibious assault landings.

To complete this mission, a system is required to clear and/or neutralize mines and obstacles from a beachhead environment in preparation for a vehicle-mounted amphibious assault. The system must be capable of providing cleared lanes for tracked vehicles in initial assault waves of the landing force. The system must provide a rapid wide area clearance on the beach and be able to support the initial movement inland.

THE APPROACH

The Joint Amphibious Mine Countermeasures (JAMC) system was designed to conduct this mission. The JAMC system consists of an armored D7G tractor configured to operate mechanical, electromagnetic, and explosive clearing subsystems. This suite of mine countermeasure tools is used to clear mines and light obstacles on the beachhead. The JAMC system is delivered to the beach by a naval surface craft and is capable of either teleremote or manual operations.



The Joint Amphibious Mine Countermeasures (JAMC) System

ENGINEERING DEVELOPMENT

The D7G tractor was designated as the prime mover for the JAMC system. A Vehicle Control System (VCS) was implemented on the tractor to provide control of all D7G mobility

functions and all subsystem functions. The Operator Control Unit (OCU) provides a remote control station, including video feedback and navigation and mapping system detailing vehicle location and clearance progress. A full-width mine rake is employed to clear mines out of the path of the vehicle, and a magnetic countermine system is used to detonate magnetically fused mines in front of the vehicle.

A chain array is dragged between two vehicles to clear wire obstacles and detonate tilt-rod and magnetically fused mines. The deployment system mechanically deploys an explosive net array of shape charge munitions to widen the clearance area. A marking system is employed to mark the cleared lane.

The fully integrated JAMC system was evaluated as part of the Advanced Concepts Technology Demonstration (ACTD) at Camp Lejeune, NC, in September 1997.



The D7G Tractor – The Prime Mover for the JAMC System

FUTURE EFFORT

Efforts are underway to develop additional robotic mine and obstacle clearance tools for the US Marine Corps. In addition to future employment and testing of the JAMC system, a remote control system will be integrated on a D8 tractor that will implement a full-width mine plow to clear mines and hardened obstacles. Integration and testing of a remotely controlled flail system is also under consideration.

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